AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) Process for extracting a geological horizon and related properties from a seismic representation, comprising: ~~in which there is constructed~~

constructing a continuous function $S_{ij,k}(t)$ by interpolation or approximation of the discrete seismic functions of a multidimensional seismic matrix, said function being designated as a "continuous local seismic trace," comprising the following steps:

a.) using as optimum (vertical) offset of two adjacent continuous local seismic traces, the value of offset rendering the maximum their correlation function, this optimum offset being not necessarily a whole number multiple of the vertical sampling interval;

b.) taking as conditional neighborhood a central continuous local seismic trace $S_{ij,k}(t)$, the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets $h_{ij,pq,k}$ associated with correlations $R_{ij,pq,k}(h_{ij,pq,k})$ greater than a predetermined threshold comprised between 0 and 1;

c.) constructing a two-dimensional extraction matrix adapted to be filled with extracted points belonging to the same horizon as the one passing through the seed point;

d.) selecting a seed point P(i,j,t) and determining the point P(i,j,k) of the three-dimensional seismic matrix that is vertically closest;

e.) estimating the properties associated with the conditional neighborhood and filling the two-dimensional extraction matrix with properties offset by translation of the current variable (t) of the optimum offset value ($h_{ij,pq,k}$) corresponding to the vertically nearest point (i,j,k); and

f.) making a record of the two-dimensional extraction matrix with properties corresponding to the vertically nearest point.

2. (original) Process according to claim 1, in which there is used as the seed point of step d) all the new points stored in the two-dimensional matrix of step b) and not yet used as grain points.

3. (previously presented) Process according to claim 1, in which the content of the two-dimensional matrix of step c) is successively filled in the course of successive extraction repetitions.

4. (previously presented) Process according to claim 1, in which the content of the two-dimensional matrix of step c) is successively replaced by a mean of the successive contents in the course of successive extraction repetitions.

5. (previously presented) Process according to claim 1, in which the property of the extracted subsurface is an assembly of seismic attributes calculated at each extraction point on the horizon passing through the seed point, the computation of these attributes being itself carried out simultaneously with the extraction of these points.

6. (previously presented) Process according to claim 1, in which there is visualized along a visualization screen the seismic attributes painted on the extracted horizon.

7. (previously presented) Device for practicing the process according to claim 1, comprising means to use as optimum offset of two adjacent continuous local seismic traces, the value of offset rendering maximum their correlation function, means to take as conditional neighborhood of a reference central continuous local seismic trace $S_{ij,k}(t)$ the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets $h_{ij,pq,k}$ associated with correlations $R_{ij,pq,k}(h_{ij,pq,k})$ greater than a predetermined threshold comprised between 0 and 1, means

to construct a two-dimensional extraction matrix adapted to be filled with extracted values, means to select a seed point P(i,j,t) and to determine the point P(i,j,k) that is vertically closest, and means to estimate the related properties of the conditional neighborhood and to fill the two-dimensional extraction matrix with properties offset by translation of the current variable (t) of the value of the optimum offset ($h_{ij,pq,k}$) corresponding to the vertically nearest point (i,j,k).

8. (previously presented) Device according to claim 7, comprising memorization means and visualization means for the seismic parameters.

9. (previously presented) Computer program, comprising elements for program code to execute the steps of the process according to claim 1, when said program is executed with a computer.

10. (original) Computer software, comprising program code elements to execute the steps of the process according to claim 6, when said program is executed by a computer.

11. (previously presented) Process according to claim 2, in which the content of the two-dimensional matrix of

step c) is successively filled in the course of successive extraction repetitions.

12. (previously presented) Process according to claim 2, in which the content of the two-dimensional matrix of step c) is successively replaced by a mean of the successive contents in the course of successive extraction repetitions.

13. (previously presented) Process according to claim 2, in which the property of the extracted subsurface is an assembly of seismic attributes calculated at each extraction point on the horizon passing through the seed point, the computation of these attributes being itself carried out simultaneously with the extraction of these points.

14. (currently amended) Process according to claim 5, in which there is displayed ~~visualized~~ along a visualization screen the seismic attributes painted on the extracted horizon.

15. (new) Process for extracting a geological horizon and related properties from a seismic representation, comprising the steps of:

obtaining a three-dimensional seismic matrix by picking up measurements registered at the coordinate points i, j;

recording a time-wise representation of the pickup of the measurements time-wise a descending axis t representative of a depth of a vertical descending from a ground surface or a sea surface, each of the measurements characterized by a picked-up amplitude at a corresponding sampling time or depth tk, wherein each discrete measurement carried out by the geophone Gij at the corresponding time or depth tk is called the seismic amplitude Sij,k,

the recording saving the assembly of seismic amplitudes corresponding to each geophone Gij of each coordinate i,j as a one-dimensional matrix (Sij1, Sij2, ..., Sijk, ..., SijN) called a discrete seismic trace corresponding to a trace according to the point of the horizontal coordinates i,j;

constructing a continuous function $S_{ij,k}(t)$ by interpolation or approximation of the discrete seismic functions of a multidimensional seismic matrix, said function being designated as a "continuous local seismic trace," comprising the following steps:

a.) using as optimum (vertical) offset of two adjacent continuous local seismic traces, the value of offset rendering the maximum their correlation function, this optimum offset being not necessarily a whole number multiple of the vertical sampling interval;

b.) taking as conditional neighborhood a central continuous local seismic trace $S_{ij,k}(t)$, the sub-neighborhood

consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets $h_{ij,pq,k}$ associated with correlations $R_{ij,pq,k}(h_{ij,pq,k})$ greater than a predetermined threshold comprised between 0 and 1;

c.) constructing a two-dimensional extraction matrix adapted to be filled with extracted points belonging to the same horizon as the one passing through the seed point;

d.) selecting a seed point P(i,j,t) and determining the point P(i,j,k) of the three-dimensional seismic matrix that is vertically closest;

e.) estimating the properties associated with the conditional neighborhood and filling the two-dimensional extraction matrix with properties offset by translation of the current variable (t) of the optimum offset value ($h_{ij,pq,k}$) corresponding to the vertically nearest point (i,j,k); and

f.) making a record of the two-dimensional extraction matrix with properties corresponding to the vertically nearest point.

16. (new) The process of claim 15, comprising the further step of displaying a seismic attribute on an extracted horizon by painting with corresponding colors.

17. (new) A computer readable storage medium tangibly embodying a program of instructions executable by a computer to control the computer to function for extracting a geological

horizon and related properties from a seismic representation, the program causing the computer to:

construct a continuous function $S_{ij,k}(t)$ by interpolation or approximation of the discrete seismic functions of a multidimensional seismic matrix, said function being designated as a "continuous local seismic trace," comprising the following steps:

a.) using as optimum (vertical) offset of two adjacent continuous local seismic traces, the value of offset rendering the maximum their correlation function, this optimum offset being not necessarily a whole number multiple of the vertical sampling interval;

b.) taking as conditional neighborhood a central continuous local seismic trace $S_{ij,k}(t)$, the sub-neighborhood consisting in adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets $h_{ij,pq,k}$ associated with correlations $R_{ij,pq,k}(h_{ij,pq,k})$ greater than a predetermined threshold comprised between 0 and 1;

c.) constructing a two-dimensional extraction matrix adapted to be filled with extracted points belonging to the same horizon as the one passing through the seed point;

d.) selecting a seed point P(i,j,t) and determining the point P(i,j,k) of the three-dimensional seismic matrix that is vertically closest;

e.) estimating the properties associated with the conditional neighborhood and filling the two-dimensional

extraction matrix with properties offset by translation of the current variable (t) of the optimum offset value ($h_{ij,pq,k}$) corresponding to the vertically nearest point (i,j,k); and

f.) record of the two-dimensional extraction matrix with properties corresponding to the vertically nearest point.

18. (new) The computer readable storage medium of claim 15, further comprising recorded instruction to cause the computer to display a seismic attribute on an extracted horizon by painting with corresponding colors.